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EXAMINER

TUROC, DAVID P

ART UNIT PAPER NUMBER

1762

DATE MAILED: 05/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/666,025

Applicant(s)

BASCERI ET AL.

Examiner

David Turocy

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 February 2005.  
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 and 41-53 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-11 and 41-53 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

1. The applicant's amendments, filed 2/17/2005, have been fully considered and reviewed by the examiner. The examiner notes the amendment to claims 1 and 5, with the addition of new claims 41-53. In light of the filing of a terminal disclaimer the obvious double patenting rejection has been withdrawn. Claims 1-11 and 41-53 pending.

### ***Terminal Disclaimer***

2. The terminal disclaimer filed on 2/17/2005 disclaiming the terminal portion of any patent granted on this application, which would extend beyond the expiration date of US Patent 6734051 and US Patent 6586285 has been reviewed and is accepted. The terminal disclaimer has been recorded.

### ***Response to Arguments***

3. Applicant's arguments with respect to claims 1-11 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Art Unit: 1762

5. Claims 43-53 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not properly support that no material being deposited on the substrate from a time period starting with the first feeding until starting with the second time period. The examiner notes the applicants argument that no statement or inference in the specification that the initial feeding of  $TiCl_4$  results in deposition of any material, however, the mere absence of a positive recitation in the original specification is not basis for the exclusion of a feature. *Ex Parte Grasselli* 231 USPQ 393,394. (Bd. App. 1983). Therefore, while the specification does not positively recite depositing material during the first period of time, the exclusion of deposition of material during the first period of time can be new matter.

The other dependant claims do not cure the defects of the claims from which they depend.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 41-42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Art Unit: 1762

Claims 41-42 are dependants of cancelled claims and therefore the scope of claims cannot be determined. Accordingly, for the purposes of applying art claims 41-42 have been assumed to depend from independent claim 1.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1-11 and 43-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted state of the art as taught by the applicant description in view of US Patent 5954887 by Hatano, hereafter Hatano.

Claims 1, 5-6, 10-11, 43, 47-48, 52-53: The admitted state of the art as taught by the applicants description teaches of a method for depositing a titanium silicide coating on a conductively doped silicon surface of a substrate using plasma enhanced chemically vapor deposition (PECVD) by combining a silane gas and  $\text{TiCl}_4$  under reaction conditions (Pages 1-2). The admitted state of the art as taught by the applicants description also discloses wafers often become contaminated with particles adhering to the chamber walls as a result of the deposition (pages 2-3). The admitted state of the art as taught by the applicants description fails to disclose a first feeding of  $\text{TiCl}_4$  to the chamber without any measurable silane.

Hatano teaches of a cleaning process for a PECVD apparatus (abstract). Hatano discloses removing the unnecessary portion of the film sticking to the inside walls of the apparatus by using  $\text{TiCl}_4$  gas (Column 2, lines 56-61). Hatano discloses a coating/cleaning process comprising the steps of providing a substrate within a PECVD chamber, feeding a first reactant alone to the chamber for a first period of time, and feeding the first and second reactant to the chamber for a second period of time to deposit a film on the substrate (Column 2, lines 62-Column 3, lines 7). Hatano discloses that no material is deposited on the substrate from the time period starting with the first feeding until the second feeding (Column 2, lines 62-Column 3, lines 7). Hatano discloses the first period of time is less than the second period of time (Figure 5). Hatano discloses providing a selected temperature for both the deposition process and the cleaning process (Column 6, lines 13-16). Hatano teaches of a first feeding in a plasmaless environment, however, discloses plasma generation during cleaning is

Art Unit: 1762

known in the art (Column 1, lines 49-54, Column 2, line 59). Hatano teaches that using a reactant gas for both the cleaning process and the deposition process allows for effectively and efficiently cleaning of a PECVD chamber without the necessity to increase and decrease temperature (Column 7, lines 40-57).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the admitted state of the art as taught by the applicants description to use the cleaning process as suggested by Hatano to provide a desirable cleaning of a PECVD chamber because Hatano discloses using a reactant gas for both the cleaning process and the film forming process is known in the art to clean a PECVD process without the necessity of decreasing and increasing the temperature within the chamber and thus increase efficiency and therefore would reasonably be expected to effectively provide cleaning of a PECVD chamber used to form titanium silicide coatings.

11. Claims 2, 9, 44, and 51: The admitted state of the art as taught by the applicants description in view of Hatano fails to explicitly state of providing the same pressure for both the first feeding and the second feeding. However, Hatano discloses the pressure for the first feeding is about 0.1 and 10 Torr and the pressure inside the chamber during the second feeding is maintained at a predetermined pressure (Column 5, line 27, Column 6, lines 21-25). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the same pressure for both the first feeding and the

Art Unit: 1762

second feeding with the reasonable expectation of a pressure being suitable for both the first feeding and the second feeding.

12. Claims 3-4 and 45-46: The admitted state of the art as taught by the applicants description in view of Hatano fails to explicitly state a constant or different  $\text{TiCl}_4$  flow during the first and second feedings. However, Hatano discloses introducing the respective gases at predetermined flow rates controlled with a mass flow controller (Column 5, lines 25-28). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to control the flow rates of  $\text{TiCl}_4$  as claimed with a reasonable expectation of their being suitable for depositing a coating and cleaning the chamber.

13. Claims 7-8 and 49-50: The admitted state of the art as taught by the applicants description in view of Hatano fails to explicitly state supplying  $\text{TiCl}_4$  for no greater than 3 or 5 seconds, however it is the examiners position that the time for supplying a cleaning agent is a result effective variable. If the time were too low it would result in not enough cleanings and too much time would result in no added benefits of increased cleaning.

Therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal value for the time used in the process of The admitted state of the art as taught by the applicants description in view of Hatano, through routine experimentation, to effectively clean the PECVD chamber to the desired properties.



14. Claims 41 and 42: The admitted state of the art as taught by the applicants description in view of Hatano fails to teach of using separate injector ports or mixing the gases prior to feeding for the second feeding. However, it would have been obvious to one skilled in the art at the time of the invention to feed the gases from the same or separate injector ports during the second feeding with the reasonable expectation of providing the reactant material to the chemical vapor deposition chamber prior to plasma enhanced deposition.

### ***Conclusion***

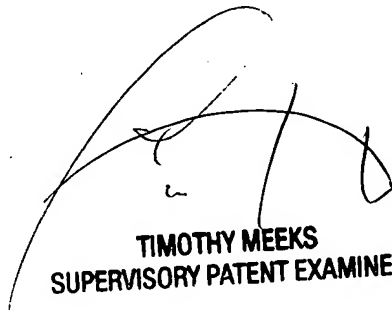
Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Turocy whose telephone number is (571) 272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1762

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Turocy  
AU 1762



**TIMOTHY MEEKS**  
**SUPERVISORY PATENT EXAMINER**